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(54) **APPLICATION INTEGRATION OF NETWORK DATA BASED ON RESOURCE IDENTIFIERS**

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USPC 709/226, 225, 229, 230
See application file for complete search history.

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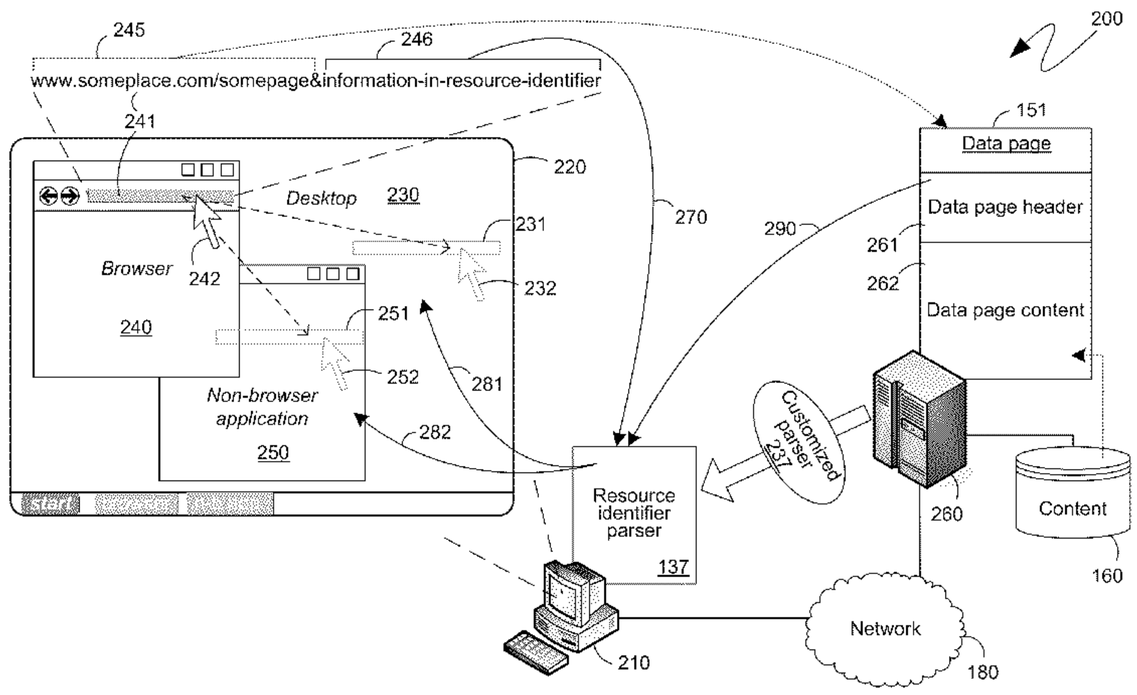
(57) **ABSTRACT**

A resource identifier parser can derive information from resource identifiers that are provided to non-browser application programs or the operating system, such as through the desktop area of a windows-based user interface. The resource identifier parser can understand the formatting of resource identifiers of specific domains and can derive therefrom information such as coordinates of a map page, the title of classified listings, and other like information. If the resource identifier cannot be parsed, the identified data page can be referenced to identify services offered by the page, such as data feed services, which can then be presented to the non-browser application program or the operating system to which the resource identifier was provided. As yet another alternative, the domain can provide a customized resource identifier parser to parse its resource identifiers. Such a customized parser can be either downloadable and locally executable or it can be a network service.

15 Claims, 3 Drawing Sheets



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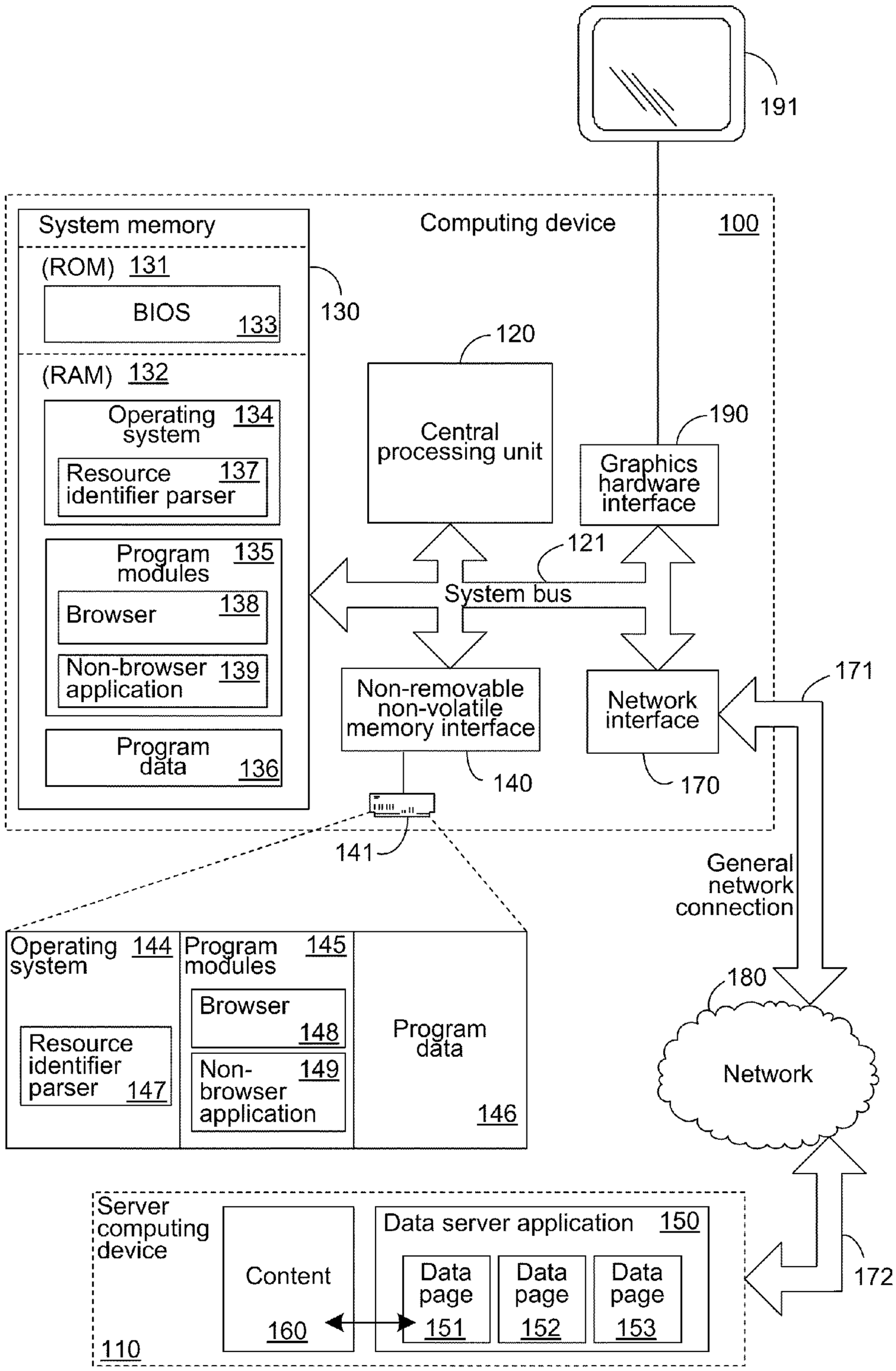
191
System memory
(ROM) 131
BIOS 133
130
(RAM) 132
Operating system 134
Resource identifier parser 137
Program modules 135
Browser 138
Non-browser application 139
Program data 136
Computing device 100
120
Central processing unit
190
Graphics hardware interface
121
System bus
Non-removable non-volatile memory interface
140
Network interface
170
171
141
General network connection
180
Network
Operating system 144
Resource identifier parser 147
Program modules 145
Browser 148
Non-browser application 149
Program data 146
Server computing device
110
Content
160
Data server application 150
Data page 151
Data page 152
Data page 153
172

Figure 1

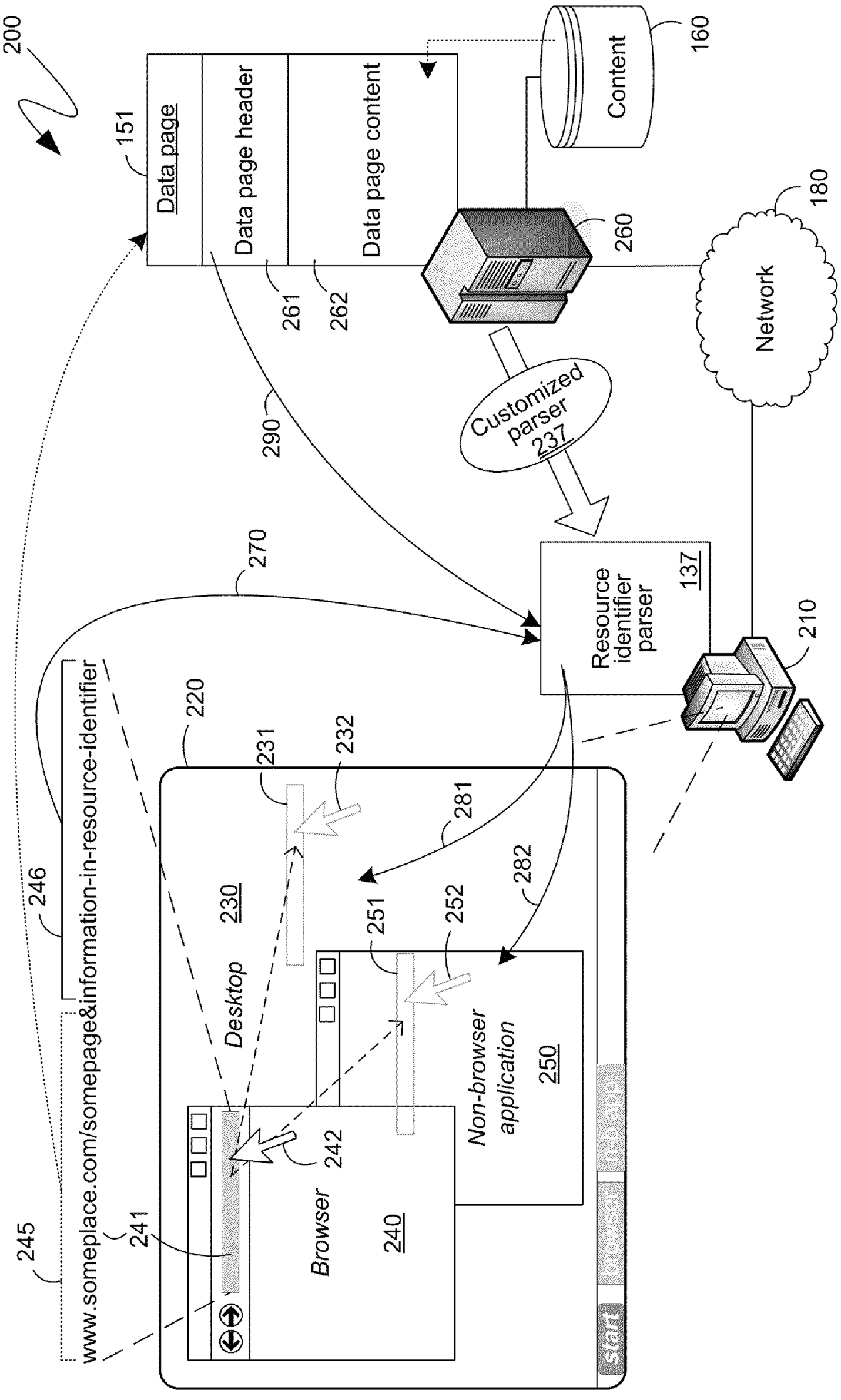
200
151
Data page
Data page header
Data page content
261
262
Content
160
260
180
Network
290
Customized parser 237
270
Resource identifier parser 137
210
220
231
232
281
282
230
251
252
246
www.someplace.com/somepage&information-in-resource-identifier
245
241
Desktop
Browser
240
242
Non-browser application
250
start
browser
non-b app

Figure 2

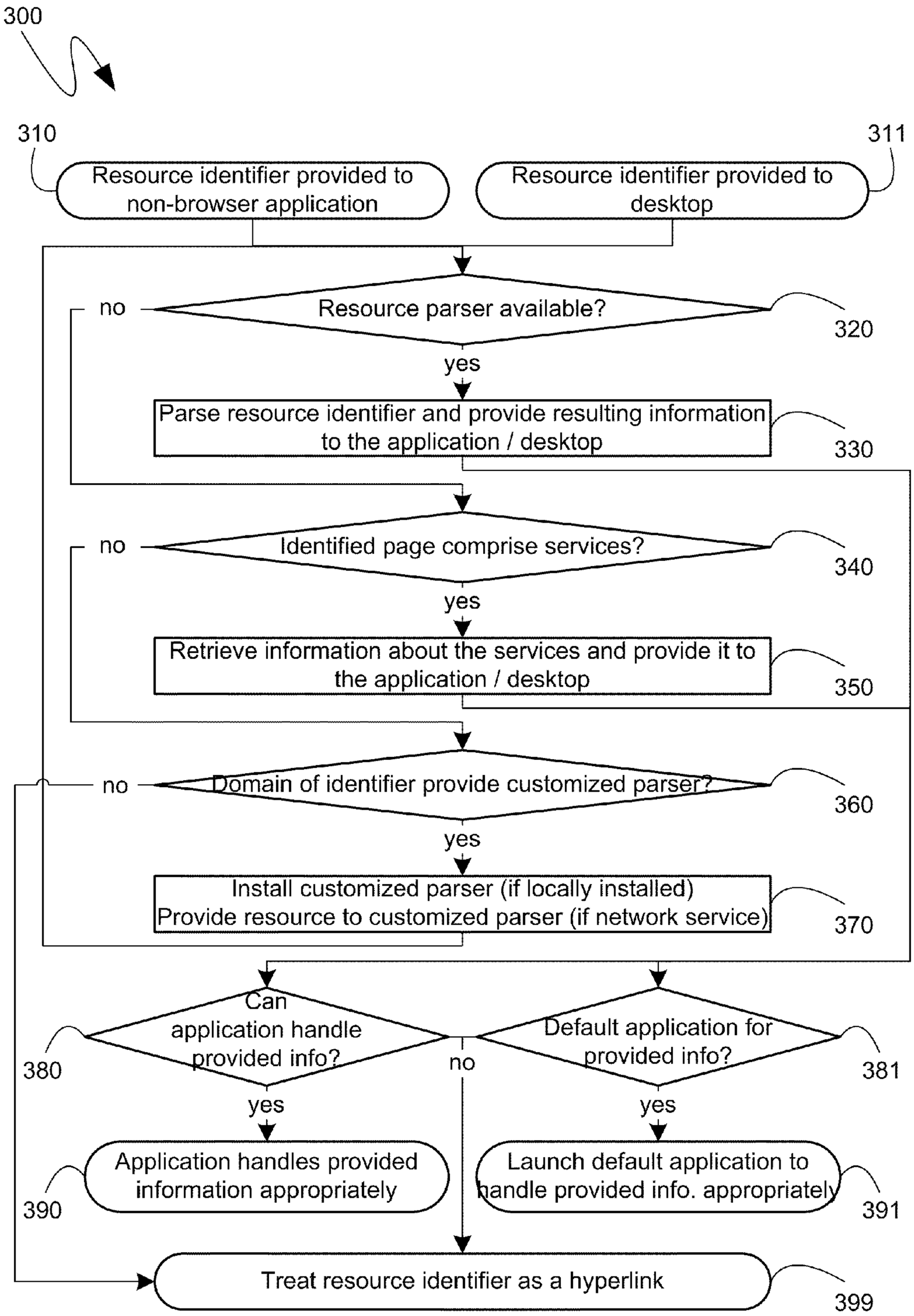
300
310
Resource identifier provided to non-browser application
311
Resource identifier provided to desktop
no
Resource parser available?
320
yes
Parse resource identifier and provide resulting information to the application / desktop
330
no
Identified page comprise services?
340
yes
Retrieve information about the services and provide it to the application / desktop
350
no
Domain of identifier provide customized parser?
360
yes
Install customized parser (if locally installed)
Provide resource to customized parser (if network service)
370
Can application handle provided info?
380
no
Default application for provided info?
381
yes
yes
Application handles provided information appropriately
390
Launch default application to handle provided info. appropriately
391
Treat resource identifier as a hyperlink
399

Figure 3

APPLICATION INTEGRATION OF NETWORK DATA BASED ON RESOURCE IDENTIFIERS

BACKGROUND

For modern computing devices, including traditional personal computers, as well as personal digital assistants, cellular telephones, and the like, network communicational abilities have become ubiquitous. Such ubiquity in network communicational abilities enables modern computing devices to spend an ever increasing amount of time being communicationally coupled to one or more networks of computing devices. Traditionally, resources provided by the computing devices that are communicationally coupled to such networks are identified and accessed by other computing devices with reference to resource identifiers. Resource identifiers are typically comprised of alphanumeric characters that uniquely identify one or more resources accessible via a network. Resource identifiers can often, not only identify a particular resource, but can also comprise programmatic information that can be provided to one or more processes executing on a remote computing device, that is being accessed over a network, to enable that remote computing device to obtain, filter, create or otherwise manipulate one or more resources prior to their transmission across the network.

Traditionally, network resources are accessed over a network via one or more network browser application programs executing on a client computing device that is accessing the resources. Such network browser applications can copy network resources to the computing device on which they are executing, display information presented by such network resources on display devices coupled to the computing devices on which such browsers are executing, provide interactivity with network resources, and other like functionality. For example, web browser application programs that are capable of browsing the ubiquitous World Wide Web (WWW) can display information in accordance with the structure and formatting defined by a web page, can download files and other objects, and can execute computer-executable instructions within the framework of the web browser. Other, non-browser, applications have the capability to act upon resources received from other computing devices over a network, but such other non-browser application programs are typically designed to only accept specific types of data and resources and may not comprise the flexibility of modern network browser application programs. Thus, on a modern computing device, a user may spend a substantial amount of time interacting only with network browser application programs to access resources available from other computing devices over a network.

SUMMARY

In one embodiment, resource identifiers can be parsed to obtain parsed information therefrom that can be provided to non-browser application programs to enable the functionality of those application programs to be extended with information associated with network-based resources without requiring a browser application program to obtain such resources.

In another embodiment, resources and content identified by a resource identifier can be obtained and examined for information that can be utilized by a non-browser application program and such information can be provide to the non-browser application program.

In a further embodiment, a remote computing device can provide a customized resource identifier parser to provide for the parsing of resource identifiers whose structure may not be known in advance. Information derived from the parsing performed by such a customized parser can be provided to non-browser application programs. The customized parser can be a downloadable component, or it can be resource that can be accessed over a network

In a still further embodiment, one or more resource identifiers can be provided to a non-browser application program and, upon such a provision, they can be parsed or the resources identified by them can be examined to provide such non-browser application programs with utilizable information beyond the mere characters of the resource identifier. If such attempts fail to identify information utilizable by the non-browser application program to which such resource identifiers were provided, the resource identifiers can be treated in a traditional manner.

In a yet further embodiment, one or more resource identifiers can be provided to a desktop user interface and, upon such a provision, they can be parsed or the resources identified by them can be examined to identify utilizable information beyond the mere characters of the resource identifier. A default application program can then be invoked to handle such indentified utilizable information within the desktop user interface context.

This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

Additional features and advantages will be made apparent from the following detailed description that proceeds with reference to the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

The following detailed description may be best understood when taken in conjunction with the accompanying drawings, of which

FIG. **1** is a block diagram of an exemplary computing device with a resource identifier parser;

FIG. **2** is a block diagram of an exemplary operation of a resource identifier parser; and

FIG. **3** is a flow diagram of an exemplary operation of a resource identifier parser.

DETAILED DESCRIPTION

The following description relates to a resource identifier parser that can obtain information, utilizable by non-browser applications programs, either from the alphanumeric characters that comprise a resource identifier, from the information contained on, or associated with, a network resource identified by the resource identifier, or via the utilization of customized parsing capability that can be provided by a service associated with the resources that are identified by the resource identifier. When a resource identifier is provided to non-browser application programs, rather than having the resource identifier merely be treated as text, or a pointer to a resource, the resource identifier parser can be utilized to provide, to the non-browser application program, the utilizable information obtained by the resource identifier parser. If no utilizable information can be obtained, the resource identifier can be treated in a traditional manner. Similarly, if a resource identifier is provided to a desktop user interface, such as is typically generated by an operating system, the resource identifier parser can obtain utilizable information,

and a default application program, or other executable component, can be instantiated to handle such information, or additional network-based content associated therewith.

While the below descriptions are directed to the implementation of the resource identifier parser within the context of specific, ubiquitous, resource identifiers, such as Uniform Resource Locators (URLs), and ubiquitous networks, such as the Internet, they are not so limited. In particular, the mechanisms described are both resource identifier and network agnostic and can operate in a manner identical to that described below on any resource identifier and on any network framework or topology. As such, references to URLs, web pages, the Internet, and the like, are meant to be exemplary only and do not indicate any specific limitation of the mechanisms described.

Although not required, the descriptions below will be in the general context of computer-executable instructions, such as program modules, being executed by one or more computing devices. More specifically, the descriptions will reference acts and symbolic representations of operations that are performed by one or more computing devices or peripherals, unless indicated otherwise. As such, it will be understood that such acts and operations, which are at times referred to as being computer-executed, include the manipulation by a processing unit of electrical signals representing data in a structured form. This manipulation transforms the data or maintains it at locations in memory, which reconfigures or otherwise alters the operation of the computing device or peripherals in a manner well understood by those skilled in the art. The data structures, where data is maintained, are physical locations that have particular properties defined by the format of the data.

Generally, program modules include routines, programs, objects, components, data structures, and the like that perform particular tasks or implement particular abstract data types. Moreover, those skilled in the art will appreciate that the computing devices need not be limited to conventional personal computers, and include other computing configurations, including hand-held devices, multi-processor systems, microprocessor based or programmable consumer electronics, network PCs, minicomputers, mainframe computers, and the like. Similarly, the computing devices need not be limited to a stand-alone computing device, as the mechanisms may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote memory storage devices.

Turning to FIG. **1**, an exemplary computing device **100** is shown. The exemplary computing device **100** can include, but is not limited to, one or more central processing units (CPUs) **120**, a system memory **130**, and a system bus **121** that couples various system components including the system memory to the processing unit **120**. The system bus **121** may be any of several types of bus structures including a memory bus or memory controller, a peripheral bus, and a local bus using any of a variety of bus architectures. The exemplary computing device **100** can optionally include graphics hardware, including, but not limited to, a graphics hardware interface **190** and a display device **191**. Such graphics hardware, including the graphics hardware interface **190** and a display device **191**, can be utilized to, not only display the below-described user interface, but also, in some embodiments, to perform some or all of the relevant computation and processing described below.

The computing device **100** also typically includes computer readable media, which can include any available media that can be accessed by computing device **100** and includes both volatile and nonvolatile media and removable and non-removable media. By way of example, and not limitation, computer readable media may comprise computer storage media and communication media. Computer storage media includes media implemented in any method or technology for storage of information such as computer readable instructions, data structures, program modules or other data. Computer storage media includes, but is not limited to, RAM, ROM, EEPROM, flash memory or other memory technology, CD-ROM, digital versatile disks (DVD) or other optical disk storage, magnetic cassettes, magnetic tape, magnetic disk storage or other magnetic storage devices, or any other medium which can be used to store the desired information and which can be accessed by the computing device **100**. Communication media typically embodies computer readable instructions, data structures, program modules or other data in a modulated data signal such as a carrier wave or other transport mechanism and includes any information delivery media. By way of example, and not limitation, communication media includes wired media such as a wired network or direct-wired connection, and wireless media such as acoustic, RF, infrared and other wireless media. Combinations of the any of the above should also be included within the scope of computer readable media.

The system memory **130** includes computer storage media in the form of volatile and/or nonvolatile memory such as read only memory (ROM) **131** and random access memory (RAM) **132**. A basic input/output system **133** (BIOS), containing the basic routines that help to transfer information between elements within computing device **100**, such as during start-up, is typically stored in ROM **131**. RAM **132** typically contains data and/or program modules that are immediately accessible to and/or presently being operated on by processing unit **120**. By way of example, and not limitation, FIG. **1** illustrates operating system **134**, other program modules **135**, and program data **136**.

A resource identifier parser **137**, whose operation will be described in detail below, can be a component of the operating system **134** or, alternatively, it can be a separate collection of computer-executable instructions that can be considered as part of the program modules **135**. As yet another alternative, components of the operating system **134** and the program modules **135** can operate in concert to perform the functionality attributed below to the resource identifier parser **137**. In addition, the program modules **135** can comprise one or more application programs, such as the network browser application program **138**, which can be comprised of computer-executable instructions that can be executed by the central processing unit **120** in accordance with mechanisms well known to those skilled in the art. The program modules **135** can also comprise one or more non-browser application programs, such as the non-browser application program **139**. Such non-browser application programs can be any application program whose primary function is other than the retrieval and presentation of information obtained from remote networked servers, including, for example, content-creation application programs, such as word processors and spreadsheets, as well as photo-editing application programs, visualization or rendering application programs, and even more limited functionality application programs such as customized weather applications, financial applications and the like.

The computing device **100** may also include other removable/non-removable, volatile/nonvolatile computer storage media. By way of example only, FIG. **1** illustrates a hard disk drive **141** that reads from or writes to non-removable, nonvolatile magnetic media. Other removable/non-removable,

volatile/nonvolatile computer storage media that can be used with the exemplary computing device include, but are not limited to, magnetic tape cassettes, flash memory cards, digital versatile disks, digital video tape, solid state RAM, solid state ROM, and the like. The hard disk drive **141** is typically connected to the system bus **121** through a non-removable memory interface such as interface **140**.

The drives and their associated computer storage media discussed above and illustrated in FIG. **1**, provide storage of computer readable instructions, data structures, program modules and other data for the computing device **100**. In FIG. **1**, for example, hard disk drive **141** is illustrated as storing operating system **144**, other program modules **145**, and program data **146**. Note that these components can either be the same as or different from operating system **134**, other program modules **135** and program data **136**. Operating system **144**, other program modules **145** and program data **146** are given different numbers hereto illustrate that, at a minimum, they are different copies. As such, the resource identifier parser **147** of the operating system **144**, and the browser application **148** and the non-browser application **149** of the program modules **145**, are likewise given different numbers to illustrate that, at a minimum, they are different copies of the resource identifier parser **137**, browser application **138** and non-browser application **139**, respectively.

Additionally, the computing device **100** can operate in a networked environment using logical connections to one or more remote computers. For simplicity of illustration, the computing device **100** is shown in FIG. **1** to be connected to a network **180** that is not limited to any particular network or networking protocols. The logical connection depicted in FIG. **1** is a general network connection **171** that can be a local area network (LAN), a wide area network (WAN) or other network. The computing device **100** is connected to the general network connection **171** through a network interface or adapter **170** which is, in turn, connected to the system bus **121**. In a networked environment, program modules depicted relative to the computing device **100**, or portions or peripherals thereof, may be stored in the memory of one or more other computing devices that are communicatively coupled to the computing device **100** through the general network connection **171**. It will be appreciated that the network connections shown are exemplary and other means of establishing a communications link between computing devices may be used.

The network **180** can have communicationally coupled to it a server computing device **110** that, although not specifically shown in FIG. **1**, can comprise equivalent hardware as that described above with reference to the exemplary computing device **100**, including, for example, a central processing unit, a system bus, system memory, non-volatile storage, and a network interface that can be equivalent to, respectively, the central processing unit **120**, the system bus **121**, the system memory **130**, the hard disk drive **141**, and the network interface **170** that were described in detail above. The network interface of the server computing device **110** can maintain a communicational connection **172** to the network **180** that can be analogous to the general network connection **171**, maintained by the computing device **100**.

In addition, unlike the exemplary computing device **100**, the server computing device **110** can comprise content **160** that can comprise data, information, or resources that the server computing device **110** can provide to other computing devices, such as the exemplary computing device **100**, over the network **180**. For example, the content **160** can comprise information that can be presented in a textual form, photographs, audio recordings, video content, downloadable computer-executable instructions, downloadable computer readable-data, locally-executable computer-executable instructions and other like content.

The server computing device **110** can further comprise a data server application **150** whose computer-executable instructions can be stored on a non-volatile storage of the server computing device and can be executed, in the system memory of the server computing device, by its central processing unit, in the same manner as the computer-executable instructions stored on the hard disk drive **141**, and executed in the system memory **130**, of the exemplary computing device **100**, described in detail above. The data server application **150** can comprise one or more formatted pages of data, such as the data pages **151**, **152** and **153** that can present data, such as obtained from the content **160**, to an appropriate network browser application program, such as the browser application program **138** executing on the exemplary computing device **100**, which can be communicationally coupled to the data server application **150**, and can retrieve any one of the data pages **151**, **152** at **153**, via the network connections **171** and **172** that the exemplary computing device **100**, and the server computing device **110**, respectively, maintain to the network **180**.

In one embodiment, the data pages **151**, **152** and **153** can be web pages such as those of the World Wide Web (WWW). In such an embodiment, the data pages **151**, **152** and **153** can present data utilizing the structured data presentation techniques of the well-known HyperText Markup Language (HTML). Similarly, the network **180**, in such an embodiment, can be the well known Internet, while the browser application **138** can be a web browser application program, and the data server application **150** can be a web server application program. In such an embodiment, the HTML coding employed to define the data pages **151**, **152** and **153** can reference, through links, the content **160** such that the data pages **151**, **152** and **153** themselves merely comprise the structure and definition of a given web page, while much of the content can remain stored apart from the data pages in the content **160**. As will be known by those skilled in the art, the exemplary computing device **100** and, more specifically, the web browser **138** can obtain the information of any one of the data pages **151**, **152** and **153** and can present such information, such as via the display device **191**, in the form of a hypermedia web page. Resource identifiers in the form of Universal Resource Locators (URLs) can be utilized by the web browser **138** to identify specific ones of the data pages **151**, **152** and **153**, utilizing techniques well known, and, indeed, ubiquitous, and the art.

Turning to FIG. **2**, the system **200** shown therein illustrates exemplary mechanisms by which the resource identifier parser **137** can parse resource identifiers and provide utilizable information to non-browser application programs that may otherwise have treated the resource identifier as nothing more than a series of alphanumeric characters. As shown in the system **200** of FIG. **2**, a computing device **210** can present a user interface **220**. The computing device **210** can be in the form of the exemplary computing device **100** described in detail above and shown in FIG. **1**. In such a case, the user interface **220**, presented by the computing device **210**, can be presented through graphical hardware, such as the graphics hardware interface **190** and graphic display device **191**, shown in FIG. **1** and described above.

As will be recognized by those skilled in the art, the user interface **220** illustrates a window-based user interface, such as has become ubiquitous in modern computing devices, whereby information and content is presented to the user through windows, or defined graphical regions, that are under the control of, and visually represent, a particular application

program, or other set of executing computer-executable instructions. The exemplary user interface **220** illustrated in FIG. **2** comprises a browser window **240**, a non-browser application window **250**, and a desktop area **230**. As will also be recognized by those skilled in the art, window-based user interfaces typically present their windows overlaid on a background commonly known as "the desktop" that can represent a visual and storage area that is typically controlled by the operating system providing the window-based user interface, such as the operating system **134** shown in FIG. **1**. Typically, the desktop area **230** acts as a temporary storage area where users can save files that they desire short-term immediate access to. Additionally, many modern operating systems enable the desktop area **230** to comprise one or more applets, widgets, or other collections of computer-executable instructions whose functionality is somewhat limited and whose display comprises only a small portion of the desktop area **230**. For example, modern operating systems can enable a weather widget to execute and present, at least visually, its information, such as the current temperature and weather, within a small defined area of the desktop area **230** that is not perceived as a window, such as would be presented by a more fully-featured application program.

In one embodiment, as illustrated in the system **200** of FIG. **2**, a resource identifier, such as would typically be utilized by the browser **138**, and that is typically shown in the browser window **240**, can be copied from the browser to either a non-browser application **139**, controlling the non-browser application window **250**, or it can be copied to the operating system **134**, such as would control the desktop area **230**. More specifically, as shown in FIG. **2**, the browser window **240** can comprise an area within which a resource identifier **241** can be specified for directing the browser **138** to retrieve the resources identified by that resource identifier **241**. Additionally, the resource identifier **241** displayed within such an area is typically the resource identifier of the resources that are being presented within the main portion of the browser window **240**. One mechanism by which a user can copy the resource identifier from the browser **138** to other applications or the operating system **134**, would be to drag the resource identifier **241** from the browser window **240** to a window presented by a non-browser application, such as the non-browser application window **250**, or to the desktop **230**. Such an action is illustrated in the system **200** of FIG. **2** by showing the cursor **242** selecting the resource identifier **241** and then dragging it, either to the non-browser application window **250**, as represented by the ghost resource identifier **251** and ghost cursor **252**, or to the desktop **230**, as represented by the ghost resource identifier **231** and the ghost cursor **232**. Alternative mechanisms for importing, or providing, a resource identifier to non-browser application programs or the desktop, such as by copying and pasting, or through direct user input entry, are equally applicable, and the dragging mechanism was shown in FIG. **2** strictly due to ease of illustrative presentation. For example, resource identifiers may be obtained from hyperlinks within the body of the displayed page, or from any page element with an attached hyperlink. In such an example, page elements comprising resource identifiers could, in the same manner as illustrated in FIG. **2**, be dragged, or otherwise copied and pasted, into a non-browser program or the desktop **230**. As another example, a resource identifier can be obtained from email messages, textual or multi-media documents, such as word processing documents, and the like. Ultimately, the source from which the resource identifiers are obtained is immaterial and orthogonal to the descriptions provided below. As such, the descriptions provided below are equally applicable to, and are intended to describe the handling of, any resource identifier, irrespective of its source.

The resource identifier **241** shown in the system **200** of FIG. **2** illustrates a URL, such as would commonly be utilized to identify web pages, or other resources, on the WWW. As indicated previously, although the description is presented with reference to specific examples, such as the URL **241** shown in FIG. **2**, the descriptions are not intended to be so limited. As will be known by those skilled in the art, a URL can comprise identifying information **245** that can specify a specific server, or domain of servers, on the WWW and specific web pages or other resources on those severs, and can further comprise programmatic information **246** that can be presented to such servers for further processing. For example, the identifying information **245** can typically, in a URL, take the form of an enumeration of a specific server, or domain, and then subsequent enumerations of folders or directories of increasing specificity, and, ultimately, an enumeration of a specific web page or other resource, with each level being delineated by a forward slash character. Similarly, the programmatic information **246** can typically be placed after the identifying information **245**, usually after an appropriate character, such as a forward slash, a question mark, an ampersand, or a hash character, and can comprise information that can be provided to computer-executable instructions executing on a remote computing device that is hosting the web page referenced by the identifying information **245**.

The programmatic information **246** of a resource identifier **241** is typically formatted in a specific manner defined by the domain to which such programmatic information is to be presented. Thus, different domains can, and often do, utilize different formatting for the programmatic information **246**, and deciphering the programmatic information can be performed differently depending on the domain identified by the identifying information **245**. For example, if the identifying information **245** were to identify a web page, from a specific domain, that provides mapping services, the programmatic information **246** can comprise, in a predetermined order and format, an identification of the coordinates of the map to be displayed, the scale at which such a map is to be displayed, whether or not the map is to display topographic, or satellite information, and other like input that the mapping service provided by the identified web page can utilize to determine what kind of map is to be generated for the resource identifier **241**. The exact manner in which the coordinates, scale, and mapping options, for example, are encoded and presented in the programmatic information **246**, such as whether they are encoded in ASCII text, whether they are separated by commas, or semicolons, or other like characters, whether they are identified with specific variables, such as through the use of the equals sign, and what order each such element of information is presented in, can be in accordance with the formatting utilized by the domain and expected by whatever computer-executable instructions, or other services, are executing on the server computing device hosting the mapping web page identified by the resource identifier **241**.

Traditionally, as will be known by those skilled in the art, the resource identifier **241** can represent a set of data, such as the HTML coding of a web page, or other such set of data appropriate for displaying the data page **151** in the browser window **240**. In addition, however, server **260** may provide further services directed to providing data in a machine-readable form, that can be used by non-browser applications. For example, within the context of the ubiquitous WWW, a server hosing a web page can also provide eXtensible Markup Language (XML) data that can be utilized both by browser

and non-browser application programs. In one embodiment, the parsing of the resource identifier comprises the retrieval of the identity of the such further resources, which, in turn, can identify yet other data from the content **160**, or yet further services. Consequently, the descriptions below are also applicable to instances in which the resource identifier parser **137** can iteratively process succeeding levels of data and information to be able to present, or enable the obtaining of, data that was not present on the original data page, data that can be organized in a different manner than that of the original data page, or data that can be interacted with, such as by uploading, or otherwise providing, new data.

In one embodiment, the resource identifier parser **137** can comprise an understanding of the formatting of the programmatic information **246** associated with the resource identifier **241** of at least some well-known domains on the network **180**. As such, the resource identifier parser **137** can parse the resource identifier **241**, and extract information from the programmatic information **246** of the resource identifier **241**, without having to communicate with a server identified by the resource identifier **241**. The resource identifier parser **137** can, thereby, enable non-browser application programs and the operating system to utilize such extracted information and provide associated services and feedback when those non-browser application programs, or the operating system, receive, as input, a resource identifier **241**.

Traditionally, providing a resource identifier to a non-browser application program would cause the non-browser application to treat the resource identifier as a textual string or, at most, as a link, or even to simply ignore the resource identifier altogether if the non-browser application was simply not capable of receiving such input. Similarly, providing a resource identifier to an operating system, such as by providing it to the desktop being presented by such operating system, would cause the operating system to create a link file representing the resource identifier, or potentially to invoke a browser application to handle the resource identifier.

However, since the resource identifier parser **137** can parse the resource identifier, such as the resource identifier **241**, and extract therefrom information beyond merely the alphanumeric characters of the resource identifier, non-browser application programs and the operating system can provide greater functionality when resource identifiers are provided to them. For purposes of the below description, the term "derivative information" means any of the information that can be extracted from a resource identifier, including information that can be obtained from parsing the programmatic information **246** that can be part of the resource identifier **241**, as well as any information that can be obtained from the resource identified by the resource identifier, such as data feeds or other like information. For example, if the non-browser application window **250**, shown in the system **200** FIG. **2**, were a spreadsheet provided by a spreadsheet application program, the dragging of the resource identifier **241** to the non-browser application window **250**, as shown by the ghost resource identifier **251**, would generally result in the placement of the alphanumeric characters of the resource identifier **241** into a cell of the spreadsheet. In the illustrated embodiment of the system **200** of FIG. **2**, however, the programmatic information **246** of the resource identifier **241** can be parsed by the resource identifier parser **137**, as indicated by the communication **270**, and the resource identifier parser **137** can derive, from such programmatic information **246**, derivative information that may be natively usable by the spreadsheet application generating the non-browser application window **250**.

For example, if the resource identifier **241** was the resource identifier of a web page comprising an auction listing or a classified listing, the programmatic information **246** can comprise the title assigned to such a listing, which can typically be a short description of the item being sold or auctioned, as well as other information such as the end date and time of the auction, or the date and time when the classified listing was first listed. Derivative information, such as this title and date information, can be provided by the resource identifier parser **137** to the spreadsheet, as indicated by the communication **282**, and can then be incorporated by the spreadsheet application program in a more meaningful way. For example, the title can be placed into one spreadsheet cell, while the listing date, or expiration time can be placed into another, associated spreadsheet cell. The provision of such derivative information, via the communication **282**, by the resource identifier parser **137** to the spreadsheet application can be either in place of the provision of the textual information of the resource identifier **241** itself, or can be in addition to, such that the spreadsheet application can include not only the parsed information provided by the resource identifier parser **137**, but could also include the resource identifier **241** itself.

In one embodiment, the derivative information obtained by the resource identifier parser **137** may not all be utilized by the non-browser application program, or the desktop **230**. For example, if the resource identifier **241** was the resource identifier of a web page comprising a map, the programmatic information **246** can comprise, as indicated previously, coordinate information, scale information and display specifics, such as whether the displayed map comprises topographic features. The non-browser application that presents the non-browser application window **250** and receives the communication **282** may not, however, be able to utilize all such derivative information. For example, the non-browser application may be a weather application that can simply use the coordinate derivative information to obtain a zip code, or other such geographic identifier, and then present information in accordance with that zip code. Thus, the mere provision of derivative information by the resource identifier parser **137**, such as via the communication **282**, does not require that the receiving application utilize all, or even any, of such information. In one embodiment, a protocol can be established by which specific application programs can register, or otherwise indicate to the resource identifier parser **137**, which types of derivative information such application programs can meaningfully process.

The derivative information obtained by the reference identifier parser **137** can, in one embodiment, be provided to non-browser application programs or the desktop **230** as a rich object that can expose properties and methods which can be accessed and utilized by the non-browser application programs or the desktop. For example, returning to the above examples of map-based data pages, the coordinate information can be exposed as a property, or a method can be exposed that, when invoked, can provide such coordinate information. Other examples, described further below, can comprise continuously updated derivative information, or more complex derivative information, such as that associated with network services that can be associated with the resource identifier. In such cases, the derivative information can be accessed through the calling of exposed methods and through the properties of the one or more objects, which can be exposed by the resource identifier parser **137** and can be changed in accordance with the derivative information obtained by the resource identifier parser.

As another example of obtaining derivative information from a resource identifier, if the resource identifier **241** were dragged onto the desktop area **230**, as illustrated in FIG. **2** by

the ghost resource identifier **231**, the resource identifier parser **137** could, again, parse the resource identifier **241** and derive, such as from the programmatic information **246**, derivative information that can be meaningfully utilized by the operating system hosting desktop area **230**. For example, if the resource identifier **241** was the resource identifier of a web page showing a map, the programmatic information **246** can, as indicated previously, comprise the coordinates of the map, the scale of the map, and other like information. Such derivative information could be provided to the operating system, by the resource identifier parser **137**, as illustrated by the communication **281**, and could be utilized by the operating system to, for example, invoke a weather applet or widget that could display the current temperature and weather at the location of the coordinates extracted from the map resource identifier. Thus, in such an example, the provision of a resource identifier to the desktop area **230** could result in the placement of a weather widget providing meaningful information regarding the area identified by the resource identifier, rather than simply a hyperlink or other file that is nothing more than the resource identifier itself.

One advantage to the parsing of a resource identifier is that the resource identifier parser **137** need not rely on any processing, or provision of information, from a remote computing device, such as one whose resources may be identified by the resource identifier. Instead, the above described mechanisms can be performed based only on the information already present in the resource identifier, and the capability of the computer-executable instructions of the resource identifier parser **137** to meaningfully parse such information.

In another embodiment, however, the resource identifier itself may not comprise sufficient information, such as sufficient programmatic information, that can be meaningfully parsed and extracted by the resource identifier parser **137**. In such an embodiment, the resource identifier parser **137** can communicate with one or more remote computing devices whose resources are identified by the resource identifier to determine if there is additional information associated with the resource identifier that can be provided to non-browser application programs, or the operating system, as the derivative information.

As shown in the system **200** of FIG. **2**, a resource identifier, such as the resource identifier **241**, can comprise identifying information **245** that can identify a data page, such as the data page **151**, being hosted by a server computing device **260** to which the client computing device **210** is communicationally coupled via the network **180**. The data page **151** can comprise a header **261**, such as can be utilized to convey meaningful information regarding the data page **151** to a browser application, such as the browser application **138**, shown in FIG. **1**, and can further comprise content **262** that can provide the formatting and structure of the presentation of information or other resources from the content **160** within the context of the data page **151**. The resource identifier parser **137** can, based on the identifying information **245** of the resource identifier **241**, obtain derivative information from the data page **151**, such as via communications between the client computing device **210** and the server computing device **260** that are directed over the network **180**. Among the derivative information that the resource identifier parser **137** can obtain can be information from the header **261**, as illustrated by the communication **290** shown in the system **200** FIG. **2**. Information from the header **262**, obtained by the resource identifier parser **137**, as illustrated by the communication **290**, can be provided by the resource identifier parser to the non-browser application or the operating system, as illustrated by the communications **282** and **281**, respectively, instead of, or in addition to, the resource identifier **241**.

Thus, for example, if the non-browser application program, that presents the non-browser application window **250**, is a photo viewing program, the resource identifier parser **137** can obtain information from the data page header **261** that can specify a feed of photographs, such as can be provided by photo-oriented network services, and the photo viewing program can directly receive those photographs and display them in the non-browser application window **250**. Returning to the specific embodiment of web pages, there exist, as will be known by those skilled in the art, photo sharing websites where users can subscribe to receive updates when any of their identified colleagues upload new photographs to the website. Information regarding the user, such as the user's name, and, potentially, even an encoded password, can be part of the programmatic information **246** that can be parsed from the resource identifier **241** by the resource identifier parser **137**. Utilizing such information, the resource identifier parser **137** can log onto such a photo sharing website as the user identified by the programmatic information **246** of the resource identifier **241** and can obtain, such as from the header **261**, information regarding this automated provision of colleagues' photographs. Such information, or even the photographs themselves, can then be provided by the resource identifier parser **137** to the photo viewing application and can be displayed within the non-browser application window **250**. Thus, a photo viewing application that could not even understand a resource identifier, can now meaningfully display photographs that can be represented by the resource identifier **241** that can have been provided to the photo viewing application.

As another example, if the resource identifier **241** was provided to the desktop area **230**, the header **261** could identify one or more feeds of data, such as those in accordance with known standards, such as the Really Simple Syndication (RSS) standard. The resource identifier parser **137** can obtain such derivative information from the header **261** based upon the identifying information **245** provided by the resource identifier **241**. The resource identifier parser **137** can then provide such derivative information to the operating system which can, as an example, launch an RSS feed viewer applet, or widget, to display the data feeds within a small area of the desktop area **230** located close to where the user, for example, dragged and dropped the resource identifier **241**, as illustrated by the ghost resource identifier **231** shown in the system **200** FIG. **2**. In one embodiment, the operating system can consider the type or format of the derivative information being provided by the resource identifier parser **137** and can select a default application, applet, widget, or other set of computer-executable instructions that are associated with that type or format, and the operating system can then invoke those computer-executable instructions to handle that derivative information. As a result, while the provision of derivative information to non-browser application programs may be limited by the capability of the specific non-browser application program to which such information is provided, and to which the user indicated the resource identifier **241** should initially be provided, the provision of a resource identifier **241** to the desktop area **230** is not so limited since the operating system can select from any of a number of collections of computer executable-instructions to handle the derivative information being provided by the resource identifier parser **137**.

Additionally, the parsing of a resource identifier can enable non-browser applications, or applications, widgets or applets invoked by the operating system, to perform data "mashups". Returning to the above examples of a data feed, if the oper-

ating system launched a data feed viewer applet, or widget, as a result of the user dragging the resource identifier **241** to the desktop area **230**, as shown by the ghost resource identifier **231**, then the provision of a second resource identifier that also identifies a data page whose header comprises a reference to another data feed, the resource identifier parser **137** can provide derivative information comprising that subsequent data feed to the same data feed viewer applet. The data feed viewer applet could then display, not only the data feed associated with the first resource identifier that the user provided to the desktop area **230**, but can also display the data feed associated with the subsequent resource identifier. If the data feeds were provided in chronological order, such that the most recent data element received from the data feed was presented at the top, the data feed viewer could intermix the two data feeds such that their data elements were organized according to an aggregate chronological order. In such a manner a "mashup" of the data of the two data feeds could be accomplished.

In yet another embodiment, a server computing device, such as the server computing device **260**, can provide a customized parser **237** to parse resource identifiers, such as the resource identifier **241**, that identify resources available through the server computing device **260**. The customized parser **237** can parse resource identifiers, such as the resource identifier **241** by extracting information from the programmatic information **246** of those resource identifiers, much in the same way as described above with reference to resource identifier parser **137**. One difference, however, between the resource identifier parser **137** and the customized parser **237** can be that, because the customized parser **237** is provided by the domain generating the resource identifiers in the first place, the customized parser **237** may be more appropriate for the parsing of resource identifiers that the resource identifier parser **137** may not know how to parse correctly.

To obtain the customized parser **237**, the resource identifier parser **137** can utilize the identifying information **245** of the resource identifier **241** to communicationally connect with the data page **151** identified by such identifying information **241**. Such a communicational connection can enable the resource identifier parser **137** to learn from the data page **151**, such as, for example, from the data page header **261**, of the existence of the customized parser **237**. In one embodiment, the customized parser **237** can be a downloadable collection of computer-executable instructions that the resource identifier **137** can download to the computing device **210**. In such an embodiment, an association between the customized parser **237** and the domain of resource identifiers with which the customized parser **237** is to be utilized can be retained, such as in a registration database of the computing device **210**, so that in the future, when the resource identifier parser **137** encounters a resource identifier of a relevant domain, the resource identifier parser **137** can invoke the customized parser **237** to parse such a resource identifier. Alternatively, the customized parser **237** can simply be stored on the computing device **210** and, in the future, when the resource identifier parser **137** encounters a resource identifier, it can merely poll the customized parsers stored on the computing device **210** to determine which, if any, of those customized parsers can parse the resource identifier encountered.

In an alternative embodiment, the customized parser **237**, rather than being a downloadable set of computer-executable instructions that are designed to execute on a client computing device, such as the computing device **210**, can, instead, be a network service to which a resource identifier can be provided, such as by the resource identifier parser **137**, and, in return, parsed information from that resource identifier can be provided. The resource identifier parser **137** can then proceed to provide such a parsed information to non-browser application programs or the operating system, as described previously. In such an alternative embodiment, the data page header **261** can provide information to the resource identifier parser **137** of the existence and location of a network service providing such a customized parser **237**, thereby enabling the resource identifier parser **137** to provide the resource identifier, such as the resource identifier **241**, to such a service and receive therefrom the parsed information.

While the above mechanisms are applicable to the parsing of any type of resource identifiers, and the obtaining therefrom, in the manner described, of any type of derivative information, in one embodiment the resource identifiers can be resource identifiers of a data page, such as the data page **151**, that can be directed to a particular person. For example, as will be known by those skilled in the art, social networking has become increasingly popular and, in such a context, a single data page, such as the data page **151**, can cause the display on a browser window, such as the browser window **240**, of a myriad of information regarding one particular user, such as, for example, the user's name, age, interests, photos of the user, messages from other users that have "befriended" the user through the social networking service offered by, for example, the server **260**, the user's upcoming appointments, documents authored by the user, and other like information. The result can be that, colloquially, the data page **151**, and its associated resource identifier **241**, become identified with that particular person. They, in essence, come to represent that particular person, at least in a network context.

However, as will also be recognized by those skilled in the art, in such a social networking context, the data that can constitute a particular person, or, more specifically, the network representation of that person, can be dynamic, fluid, and context dependent. For example, the messages provided by that person's social networking friends can continuously change, as can the photos of that person, the documents they authored, and other like content and information. Consequently, in one embodiment, a resource identifier, such as the resource identifier **241**, that can identify a data page, such as the data page **151**, that can be a particular individual's page, such as in a social networking service provided by the server computing device **260**, can be parsed and that particular individual's identifier, within the context of the social networking service, can be obtained. Such an identifier can then be utilized as a key with which to access or obtain other information, such as through services offered by the server computing device **260** hosting the data page **151**. Such other services can provide access to the dynamic and fluid information that can comprise that specific person's network profile including, for example, providing access to the messages provided to such a person by that person's social networking friends, the photos uploaded by, for, or on behalf of, that person, the documents authored by that person, and other like dynamic information. In particular, the parsing of a resource identifier identifying a data page associated with a particular person within the context of a social network can provide access to information that does not even exist yet. For example, the parsing of such a resource identifier can provide access to services that will deliver, at a future time, information associated with that particular person that was created at that future time, such as messages from friends, or new photographs. Consequently, the resource identifier parser **137** can enable a resource identifier to become a universal representation of a particular person. As such, depending on the context, the desktop or non-browser applications can retrieve any relevant piece of data associated with the person, provided that the data is made

available from the social networking service provided by the server computing device **260** and permitted by relevant access rules to be accessed using that person's identifier that can have been obtained from the resource identifier by the resource identifier parser **137**.

Turning to FIG. **3**, the flow diagram **300** shown therein illustrates an exemplary series of steps, such as can be performed by the resource identifier parser **137** shown in FIGS. **1** and **2**. Processing can be initiated, as shown in the flow diagram **300** of FIG. **3**, either when a resource identifier is provided to a non-browser application program, such as is shown in step **310**, or, alternatively, when the resource identifier is provided to the desktop, such as is shown in step **311**. As the steps of the flow diagram **300** are mostly applicable to either case, the flow diagram **300** has been illustrated such that, for the steps that do differ, steps illustrated on the left-hand side of the diagram correspond to the initiation performed at step **310**, wherein the resource identifier was provided to a non-browser application program, while the steps illustrated on the right-hand side of the diagram correspond to the initiation performed at step **311**, wherein the resource identifier was provided to the desktop. Steps that span both sides of the diagram are equally applicable irrespective of the manner in which processing was initiated. Thus, as shown, irrespective of whether the resource identifier was provided to the non-browser application at step **310**, or to the desktop at step **311**, processing can proceed with step **320**, at which point determination can be made as to whether a parser is available for that type of resource identifier, or, more specifically, whether the capability to parse such a resource identifier has been provided for, either in the resource identifier parser **137**, or through a customized parser **237**, as shown in FIG. **2**.

As indicated previously, for customized parsers, such as can be obtained at step **370**, described in detail below, step **320** can comprise either a check of a registration database, wherein the customized parser can be associated with resource identifiers of a specific domain, or, alternatively, a polling of available customized parsers, in turn, to find one that can parse the resource identifier in question. If, at step **320**, is determined that the parser is available for the resource identifier provided, processing can proceed with step **330**, at which point the provided resource identifier can be parsed, and the resulting parsed information can be provided to either the non-browser application program, or the desktop, depending on whether processing was initiated by step **310**, or step **311**, respectively. If, however, at step **320**, it is determined that a parser is not available for the resource identifier provided, processing can proceed to step **340**, at which point an examination of the page identified by the resource identifier can be performed to determine if the identified page identifies, or otherwise comprises any services, such as a data feed or other like services. If, at step **340**, it is determined that the page identified by the resource identifier does comprise services, processing can proceed with step **350** at which point information about the services can be retrieved and provided to the application, or desktop, in accordance with whichever was provided the resource identifier. Conversely, if, at step **340**, is determined that the page identified by the resource identifier does not comprise any services, processing can proceed to step **360**, at which point a determination can be made as to whether the domain of the page identified by the resource identifier offers any sort of customized resource identifier parsers.

If, at step **360**, it is determined that the domain of the page identified by the resource identifier does provide a customized parser, processing can proceed with step **370**, at which point such a customized parser can be downloaded and installed, if it is offered as a set of downloadable and locally-executable computer-executable instructions, or, alternatively, if the customized parser is provided as a network service, the resource identifier received in steps **310** or **311** can be provided to the network service at step **370**. Processing can then return to step **320** and a determination, at step **320**, can again be made as to whether a parser is available for the particular resource identifier provided. Since such a parser can have been installed, or located, as a result of step **370**, the subsequent determination, at step **320**, can result in a finding that an appropriate parser does exist and processing can proceed with step **330**, as described above. If, however, is determined, at step **360**, that the domain of the page identified by the resource identifier does not provide a customized parser, processing can proceed to step **399**, at which point the resource identifier that was provided either step **310**, or step **311**, can be treated as a resource identifier in a traditional manner, such as by treating it as a hyperlink, a collection of alphanumeric characters, or the like.

Once derivative information from the provided resource identifier has been obtained, further processing can be performed, although not necessarily by the resource identifier parser **137** that was shown in FIG. **2**, to determine whether the derivative information can be utilized by the non-browser application program, or the desktop, depending on which it received the resource identifier at steps **310** and **311**, respectively. More specifically, as shown in the flow diagram **300** of FIG. **3**, and maintaining the convention described above, if the resource identifier was provided to a non-browser application program at step **310**, and derivative information was obtained from the provided resource identifier, processing can proceed with step **380**, at which point a determination can be made as to whether the application to which the resource identifier was provided at step **310** can meaningfully accept the derivative information. If it is determined, at step **380**, that such an application cannot meaningfully accept the derivative information, then the application can treat the resource identifier in a traditional manner, such as by treating it as a hyperlink, a collection of alphanumeric characters, or the like, at step **399**. Alternatively, if, at step **380**, it is determined the application can meaningfully accept the derivative information, then the application can proceed to do so at step **390**. Similarly, if the resource identifier was provided to the desktop at step **311**, and parsed information was obtained from the provided resource identifier, processing can proceed with step **381**, at which point determination can be made as to whether an application, applet, widget, or other collection of computer-executable instructions, exists that can meaningfully accept the derivative information. If no such computer-executable instructions are determined to exist at step **381**, processing can proceed with the operating system treating the resource identifier in a traditional manner at step **399**. Conversely, if it is determined, at step **381**, that at least one set of computer-executable instructions, however packaged, exists that can meaningfully accept the derivative information, then, at step **391**, that set of computer-executable instructions can be instantiated and the derivative information can be provided to it.

As can be seen from the above descriptions, mechanisms have been provided for the parsing of resource identifiers to obtain therefrom derivative information that can be more meaningfully processed by non-browser application programs or the operating system. In view of the many possible variations of the subject matter described herein, we claim as our invention all such embodiments as may come within the scope of the following claims and equivalents thereto.

We claim:

1. One or more computer-readable memory comprising computer-executable instructions for parsing resource identifiers, the computer-executable instructions directed to steps comprising:

intercepting, at a client computing device, a resource identifier being provided to a non-browser application program executing on the client computing device;

identifying, at the client computing device, in response to the obtaining, a remote domain of a remote resource identified by the resource identifier;

obtaining, from the remote resource, information regarding a customized parser associated with the remote domain;

downloading the customized parser;

executing, at the client computing device, the customized parser to parse the resource identifier to derive derivative information therefrom and

presenting the derivative information to the non-browser application program instead of the resource identifier that was being provided to the non-browser application program.

2. The computer-readable memory of claim 1, comprising further computer-executable instructions directed to steps comprising:

obtaining, from the remote resource, information regarding services associated with the remote resource;

wherein the derivative information comprises the obtained information regarding the services associated with the remote resource.

3. The computer-readable memory of claim 2, wherein the remote resource represents a particular person, and wherein further the services associated with the remote resource comprise services providing dynamic information associated with the particular person.

4. The computer-readable memory of claim 1, wherein the computer-executable instructions directed to the utilizing the customized parser comprise computer-executable instructions for providing the resource identifier to a network service, the network service being the customized parser.

5. The computer-readable memory of claim 1, comprising further computer-executable instructions directed to steps comprising:

treating the resource identifier as an alphanumeric string if the non-browser application program to which the derivative information is presented cannot handle the derivative information.

6. The computer-readable memory of claim 1, wherein the non-browser application program comprises a desktop presented by an operating system, comprising further computer-executable instructions directed to steps comprising:

identifying a set of computer-executable instructions that can handle the derivative information;

instantiating the identified set of computer-executable instructions; and

presenting the derivative information to the identified set of computer-executable instructions.

7. A method of parsing resource identifiers, the method comprising the steps of:

intercepting, at a client computing device, a resource identifier being provided to a non-browser application program executing on the client computing device;

identifying, at the client computing device, in response to the obtaining, a remote domain of a remote resource identified by the resource identifier;

obtaining, from the remote resource, information regarding a customized parser associated with the remote domain;

downloading the customized parser;

executing, at the client computing device, the customized parser to parse the resource identifier to derive derivative information therefrom; and

presenting the derivative information to the non-browser application program instead of the resource identifier that was being provided to the non-browser application program.

8. The method of claim 7, further comprising the steps of:

obtaining, from the remote resource, information regarding services associated with the remote resource;

wherein the derivative information comprises the obtained information regarding the services associated with the remote resource.

9. The method of claim 8, wherein the remote resource represents a particular person, and wherein further the services associated with the resource comprise services providing dynamic information associated with the particular person.

10. The method of claim 7, wherein the step of utilizing the customized parser comprises the steps of:

providing the resource identifier to a network service, the network service being the customized parser.

11. The method of claim 7, further comprising the steps of:

treating the resource identifier as an alphanumeric string if the non-browser application program to which the derivative information is presented cannot handle the derivative information.

12. The method of claim 7, wherein the non-browser application program comprises a desktop presented by an operating system, the method further comprising the steps of:

identifying a set of computer-executable instructions that can handle the derivative information;

instantiating the identified set of computer-executable instructions; and

presenting the derivative information to the identified set of computer-executable instructions.

13. A system for providing derivative information to a non-browser application program in place of a resource identifier from which the derivative information was derived, the system comprising:

a client computing device remote from a domain, the client computing device comprising: the non-browser application program being provided a resource identifier; and a resource identifier parser for: obtaining, from a remote resource identified by the resource identifier, information regarding a customized parser associated with the domain; downloading the customized parser; parsing the resource identifier with the customized parser to derive derivative information therefrom and presenting the derivative information to the non-browser application program in place of the resource identifier that was being provided to the non-browser application program; and

a computing device that is part of the domain of the resource identifier, the computing device that is part of the domain comprising the customized parser for utilization by the resource identifier parser.

14. The system of claim 13, wherein the resource identifier parser provides the resource identifier to the customized parser executing at the computing device that is part of the domain and receives therefrom the derivative information.

15. The system of claim 13, wherein the non-browser application program comprises a desktop presented by an

operating system of the client computing device, and wherein further the client computing device comprising computer-executable instructions directed to identifying a set of computer-executable instructions that can handle the derivative information, instantiating the identified set of computer-executable instructions, and presenting the derivative information to the identified set of computer-executable instructions.

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